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(54) Title: PROCESS TO PREPARE A MICROCRYSTALLINE WAX AND A MIDDLE DISTILLATE FUEL

(57) Abstract: Process to prepare a microcrystalline wax and a middle distillate fuel by (a) hydrocracking/hydroisomerising a Fischer-Tropsch product, wherein weight ratio of compounds having at least 60 or more carbon atoms and compounds having at least 30 carbon atoms in the Fischer-Tropsch product is at least 0.2 and wherein at least 30 wt% of compounds in the Fischer-Tropsch product have at least 30 carbon atoms, (b) performing one or more distillate separations on the effluent of step (a) to obtain a middle distillate fuel fraction and a microcrystalline wax having an initial boiling point of between 500 and 600 °C.

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/E /07785

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 C10G73/44 C10G45/58

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 C10G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/074969 A (EXXONMOBIL RES & ENG CO) 11 October 2001 (2001-10-11) cited in the application	1-4
Y	claims 1,18; figure 1; examples 1-3; tables 1,2 page 4, lines 12-17 page 5, lines 5-8 page 7, lines 12-20 page 8, lines 9-19 ----- -/--	5-7

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>SENDEN M M G: "THE SHELL MIDDLE DISTILLATE SYNTHESIS PROCESS: COMMERCIAL PLANT EXPERIENCE AND OUTLOOK INTO THE FUTURE"</p> <p>PETROLE ET TECHNIQUES, ASSOCIATION FRANCAISE DES TECHNICIENS DU PETROLE. PARIS, FR, no. 415, 1 July 1998 (1998-07-01), pages 94-97, XP000771962 ISSN: 0152-5425 the whole document</p> <p>-----</p>	1-7
Y	<p>SIE S T ET AL: "CONVERSION OF NATURAL GAS TO TRANSPORTATION FUELS VIA THE SHELL MIDDLE DISTILLATE SYNTHESIS PROCESS (SMDS)"</p> <p>CATALYSIS TODAY, AMSTERDAM, NL, vol. 8, 1991, pages 371-394, XP000984460 figures 11-13; table 3 page 385, lines 19-28 page 387, lines 8-15 page 388, lines 14-22 page 389, lines 3-8 page 390, line 16 - page 391, line 28</p> <p>-----</p>	1-7
A	<p>GB 713 910 A (BATAAFSCHE PETROLEUM) 18 August 1954 (1954-08-18) claims 1,9-11 page 1, right-hand column, lines 61-83 page 2, right-hand column, lines 112-121 * page 3, lines 5-10 and 26-44 *</p> <p>-----</p>	1-7
A	<p>"Shell Middle Distillate Synthesis" INTERNET ARTICLE, [Online] XP002214343 Retrieved from the Internet: &lt;URL:http://www.shell.com.my/smds/&gt; [retrieved on 2002-09-23] the whole document</p> <p>-----</p>	1-7

# INTERNATIONAL SEARCH REPORT

International application No.  
/EP 03/07785

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-7

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7

process to prepare a middle distillate fuel and a microcrystalline wax comprising the hydrocracking/hydroisomerisation of a heavy Fischer-Tropsch product and the distillation of the effluent to obtain a middle distillate fuel fraction as well as a microcrystalline wax of desired quality

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2. claim: 8

microcrystalline wax with specific congealing point and hardness

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/07785

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		AU 5386201 A	15-10-2001
		CA 2403971 A1	11-10-2001
		EP 1268712 A2	02-01-2003
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